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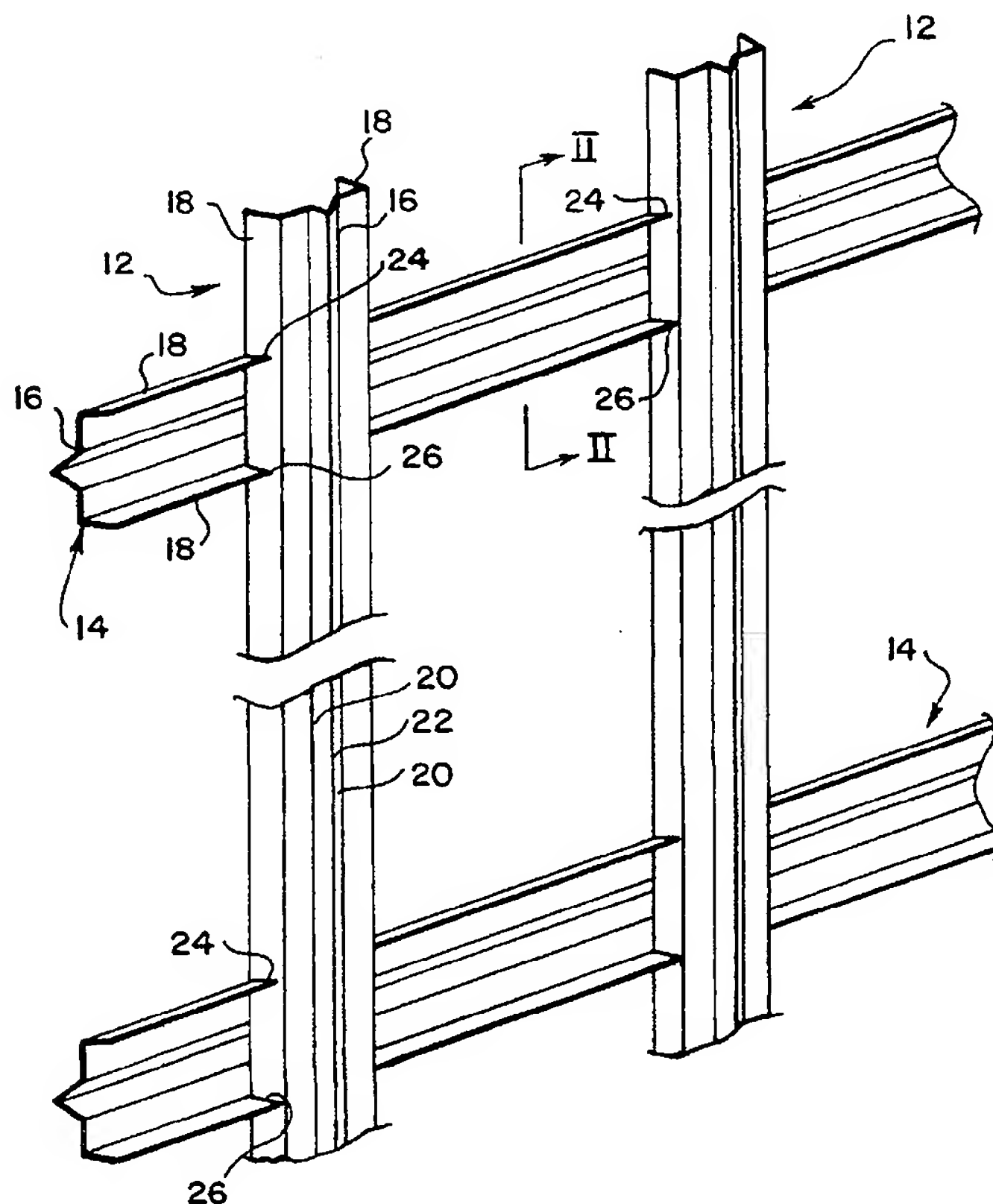
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(54) Title: CONNECTING TOGETHER ELONGATE MEMBERS

## (57) Abstract

A method of joining two intersecting channel shaped members (12, 14) is disclosed. One of the members (14) has slots (24, 26) therein and the other member (12) has its flanges (18) inserted into the slots (24, 26). The slots (24, 26) can be in the flanges (18) of the member (12) or in the web (16) of the member (12). The members (12, 14) can be the verticals and horizontals of a palisade fence.



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CONNECTING TOGETHER ELONGATE MEMBERSFIELD OF THE INVENTION

THIS INVENTION relates to a method of joining two intersecting strips and to the joint between such strips. The invention also relates to palisade fencing.

5 BACKGROUND TO THE INVENTION

Palisade fencing comprises spaced fence posts with their lower ends embedded in concrete blocks or compacted earth, two or more horizontal members spanning between adjacent fence posts, and a plurality of vertical members between adjacent fence posts. The horizontal members have their ends bolted or welded to the fence posts and the vertical members are connected to the horizontal members.

Each horizontal member is bolted or welded to each vertical member, this construction requiring all the vertical and horizontal members to be drilled and for a multitude of bolts and nuts to be used. Hence installation is time consuming and expensive, and the end result is not aesthetically pleasing. In addition, the fencing cannot be used as a D.I.Y. product.

The present invention provides a method of joining two intersecting strips which method is particularly, but not exclusively, intended for joining the vertical members of palisade fencing to the horizontal members of the palisade fencing.

-2-

BRIEF DESCRIPTION OF THE INVENTION

According to one aspect of the present invention there is provided a method of joining first and second intersecting strips one of which is of channel section and comprises a web with a flange along each edge of the web, the flanges diverging from one another in the direction away from the web, the method comprising forming two spaced slots in the other of said strips, the slots being at an angle with respect to one another, forcing said flanges of said one member towards one another to decrease the size of the gap between them, inserting the flanges into said slots and releasing the flanges so that they spring apart.

Preferably said other strip is of channel section and comprises a web and a flange along each edge of the web, and said method comprises forming first and second pairs of slots in said flanges of said other strip, the first and second pairs of slots being spaced apart from one another along said other strip and the slots of the first pair being one in each of the flanges of said other strip and the slots of the second pair being one in each of the flanges of said other strip, and inserting the flanges of said one strip into the slots of the other strip.

The method can include the step of deforming at least one of the flanges of said one strip between the flanges of said other strip thereby to prevent said one strip being slid along said other strip.

In the preferred form of the method said other strip is of channel

-3-

section and comprises a web and a flange along each edge of the web, and said method comprises forming said slots in the web of said other strip. Said web can be of V-shaped in section and comprises two flanks meeting at an apex, said slots being in the flanks and passing through said apex.

5                   According to a further aspect of the present invention there is provided a joint between first and second intersecting strips, the first strip being channel shaped and comprising a web and a flange along each edge of the web, the flanges diverging in the direction away from the web, and said second strip having a pair of slots therein, said slots being at an angle to one another, the flanges of the first strip  
10                   being in the slots of the second strip.

                  Preferably said second strip comprises a web and a flange along each edge of the web, said slots being formed in said flanges of said second strip. Said web can be planar or can include a pair of flanks meeting at an apex thereby to provide a raised rib extending in the direction of the length of the second strip.

15                   A sturdy joint is obtained where said second strip comprises a web with a flange along each edge of the web and said web comprises two sloping flanks meeting at an apex, said slots being in said web.

                  The joint can also include a cover strip fitted to said first strip, the cover strip being in the form of a channel having a web and a flange along each edge of

-4-

the web, the flanges of the cover strip diverging in the direction away from the web, outside faces of the flanges of the cover strip bearing on inside faces of the flanges of the first strip. In another form the cover strip is in the form of a channel having a web and a flange along each edge of the web, the flanges of the cover strip

5 converging in the direction away from the web, inside faces of the flanges of the cover strip bearing on outside faces of the flanges of the first strip.

According to another aspect of the present invention there is provided palisade fencing comprising a plurality of spaced fence posts with their lower ends embedded in the ground, horizontal members extending between the fence posts,

10 and a plurality of vertical members between each adjacent pair of fence posts, the vertical members and the horizontal members each being channel shaped and comprising a web and a flange along each edge of the web, the flanges of each member diverging in the direction away from the web of that member, one of said members at each place where a vertical member intersects a horizontal member

15 having slots therein, the slots being at an angle to one another, and the flanges of the member which intersects with the slotted member being in the slots of the slotted member.

The webs of the vertical members preferably comprise two sloping flanks meeting at an apex, said slots being formed in the webs of the vertical

20 members. To reduce production costs the vertical members and horizontal members can be of identical profile.

-5-

Each fence post is preferably hollow and has in the walling thereof openings the shapes of which match the profiles of said horizontal members, the ends of the horizontal members entering the fence posts through said openings and the parts of the horizontal members within the posts being deformed to prevent their withdrawal from the posts through said openings.

To enable the palisade fencing to be electrified the fence posts have holes therein above the level of the top horizontal members, there being electrically insulating grommets in the holes and wires spanning between the fence posts and passing through said grommets.

In a further form of palisade fencing that can be electrified each fence post comprises a lower part and an upper part, the upper part being mounted on the lower part by means of an electrically insulating connector whereby the upper part is electrically isolated from the lower part, there being upper horizontal members extending between the upper parts of the fence posts and each vertical member of the fencing comprising a lower part attached to a lower horizontal member and an upper part attached to an upper horizontal member, there being a gap between the lower part of each vertical member and the upper part of each vertical member whereby said parts are electrically isolated from one another.

#### BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, and to show how



-6-

the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings in which:-

Figure 1 is a pictorial view of four joints in accordance with the present invention;

5 Figure 2 is a section, to a larger scale, on the line II-II of Figure 1;

Figures 2a and 2b are sections illustrating two forms of cover strip;

Figure 3 is a pictorial view of a piece of palisade fencing;

Figure 4 is a section, to an enlarged scale, on the line IV-IV of Figure 3;

Figure 5 is a plan view of part of a metal strip;

10 Figure 6 is a pictorial view showing the strip of Figure 5 bent to form a fence post;

Figure 7 is an elevation illustrating the fence post of Figure 6 and also illustrating electrification wires; and

Figure 8 is an elevation of another form of electrified palisade fencing.

## 15 DETAILED DESCRIPTION OF THE DRAWINGS

The structure 10 shown in Figure 1 comprises two parallel members 12 and two further parallel members 14 each of which members 14 intersects the two members 12.

The members 12 are shown as being vertical members and the  
20 members 14 are shown as being horizontal members. However, for the purposes of



-7-

palisade fencing it is preferred that the members 14 be vertical and the members 12 be horizontal. The members 12, 14 are all of the same cross sectional profile and each comprises a web 16 and a flange 18 along each edge of the web 16. The flanges 18 diverge in the direction away from the web 16 as is best seen in Figure 2.

5           The members are in the form of elongate strips. Initially the strips are flat and they are profiled by cold rolling. The strips can be of galvanised or coated metal or they can be coated after being rolled. The profile of the members is such that the flanges 18 can be deformed by squeezing them towards one another to reduce the gap between them. The inherent resilience of the metal causes the  
10 flanges to spring apart when the deforming force is removed.

          The webs 16 can be planar. However, for both aesthetic purposes and for resistance to twisting and bending, it is preferred that each web comprise a pair of flanks 20 which intersect at an apex 22 running along the centre line of the member thereby to form a rib. The rib can be the full width of the strip between the  
15 flanges 18 as shown in Figures 3 and 4 or narrower than the strip as shown in Figure 1 and 2.

          The flanges 18 of the members 12 are slotted. In Figure 1 there is, at each intersection, an upper slot 24 in each flange 18 and a lower slot 26 in each flange 18. The upper slots 24 are aligned with one another and the lower slots 26  
20 are aligned with one another. The slots 24 form a first pair of slots and the slots 26

-8-

form a second pair of slots, the pairs of slots being spaced apart along the members 12.

The distance between the slots 24 and 26 in the same flange 18 measured along the free edge of the flange is less than the distance between these slots measured in a straight line between their closed ends. Thus the slots diverge in the direction away from the free edges of the flanges. This is also best seen in Figure 2 and it will be noted that the flanges 18 and the slots 24, 26 are of the same configuration. The spacing between the free edges of the flanges 18 of the members 14 is greater than the spacing between the slots measured at the entrances to the slots.

To secure a member 12 to a member 14 where they intersect, the flanges of the member 14 are squeezed towards one another. This can be achieved by means of a hand operated tool comprising two sets of spaced jaws which close onto the flanges 18 at spaced locations. It is the deformed parts of the flanges 18 between the jaws that are presented to the slots 24, 26 and pushed into the slots. When the jaws are opened the flanges spring apart thus interlocking the vertical and horizontal members.

Between the flanges 18 of the members 12, the flanges 18 of the members 14 are bent to prevent the members 12 being slid along the members 14.

This can be achieved by simply bending the flanges 18 to one side or they can be

-9-

kinked by a tool which bends a part of the flange upwards and an adjacent part downwards to an S-formation.

To provide the members 12 and 14 with a box-like appearance instead of a channel appearance, cover strips can be used. In Figure 2a a cover strip 28 is shown, this having a web 30 and a pair of flanges 32 which converge with one another in the direction away from the web 30. The inside faces of the flanges 32 bear on the outside faces of the flanges 18. The cover strips 28 can be forced onto the members 12 and/or 14 using, for example, a rubber mallet. Alternatively the cover strips can be slid on from the ends of the members 12 and 14 as erection of the fencing proceeds.

In the form of Figure 2b the cover strip is designated 34. The outside faces of the flanges 36 of the cover strip 34 bear on the inside faces of the flanges 18 of the members 12 and 14. The web 38 of the cover strip 34 lies against, or close to, the web 16 of the respective member 12 or 14. It will be understood that this cover strip 34 does not provide a box-like appearance but simply conceals the inside of the respective member 12, 14.

The construction shown in Figures 3 and 4 differs from the construction of Figures 1 and 2 in that the slots, designated 40, of the vertical members 42 are formed in the webs 44 of the vertical members and not in their flanges 46. Each web 44 is of vee-shape, the flanks 48 which meet at an apex extending from the

-10-

flanges 46 to the apex. This can be contrasted to the configuration of Figure 1 where the web has planar portions on each side of the flanks 20. The horizontal member 50 in Figures 3 and 4 is of the same configuration as the vertical members 42. In this form it is the flanges 46 of the horizontal members 50 which are bent to stop the vertical members being moved horizontally. The horizontal members 50 cannot, of course, be moved horizontally because of their connections to the fence posts, as will be described hereinafter. The vertical members 42 cannot be moved vertically because of the parts of the flanges 46 of the horizontal member 50 which are in the slots 40.

The metal strip 52 shown in Figure 5 is of planar form and only a short part of its length is illustrated. Two openings 54 are punched in the strip, these being of the same profile as the horizontal member 50 shown in Figures 3 and 4. The strip 52 is formed into the fence post 56 shown in Figure 6 by bending it along the dotted lines 58 and 60 shown in Figure 5. The openings 54 are now in opposed side walls 62 of the post. The front of the post is closed by a front wall 64 and the rear of the post is open between two flanges 66. This permits access to be had to the ends of the horizontal members 50 inserted into the post through the slots 54 so that they can be deformed and thus prevented from being withdrawn from the posts 56.

The strip 52 is punched with two holes 68 in what become the side walls 62 thereof. The holes 68 are above the openings 54 and close to the flanges

-11-

66. Grommets 70 (Figure 7) of electrically insulating material are forced into the holes 68, and wires 72 to which a high voltage is applied pass through the grommets 70. The upper horizontal members 50 of the fencing are illustrated in Figure 6 and it will be noted that they are just below the lowermost of the two wires 72. The end portions 74 of the horizontal members 50 are within the post 56.

In Figure 8 the fence post 76 is in two parts, the longer, lower part being designated 78 and the shorter upper part being designated 80. A connector 82 of synthetic plastics material, or other electrically insulating material, has a spigot 84 at each end and a central section 86 between the spigots. The spigots fit into the upper and lower parts 78, 80 of the fence post 76 and the section 86, which is of greater transverse dimensions than the spigots, prevents the upper and lower parts touching.

A horizontal member 88 extends from the part 80.

Each vertical member 42 terminates at about the level of the connector 82. Short upper vertical members 90 are secured to the horizontal member 88, there being gaps between the members 42 and 90. The entire upper part of the fence including the members 90, the member 88 and the upper part 80 can be connected to a source of high voltage.

-12-

CLAIMS:

1. A method of joining first and second intersecting strips (12, 14, 42, 50) one (14, 50) of which is of channel section and comprises a web (16, 48) with a flange (18, 46) along each edge of the web, the flanges diverging from one another in the direction away from the web, the method comprising forming two spaced slots (24, 26, 40) in the other of said strips (12, 42), the slots being at an angle with respect to one another, forcing said flanges of said one member towards one another to decrease the size of the gap between them, inserting the flanges into said slots and releasing the flanges so that they spring apart.

2. A method as claimed in claim 1, in which said other strip (12) is of channel section and comprises a web (16) and a flange (18) along each edge of the web, and said method comprises forming first and second pairs of slots (24, 26) in said flanges (18) of said other strip (12), the first and second pairs of slots being spaced apart from one another along said other strip and the slots of the first pair being one in each of the flanges of said other strip and the slots of the second pair being one in each of the flanges of said other strip, and inserting the flanges of said one strip into the slots of the other strip.

3. A method as claimed in claim 2, and including the step of deforming at least one of the flanges of said one strip between the flanges of said other strip thereby to prevent said one strip being slid along said other strip.

-13-

4. A method as claimed in claim 1, in which said other strip (42) is of channel section and comprises a web (44) and a flange (46) along each edge of the web, and said method comprises forming said slots (40) in the web (44) of said other strip (42).

5. A method as claimed in claim 4, wherein said web is of V-shape in section and comprises two flanks (48) meeting at an apex, said slots (40) being in the flanks and passing through said apex.

6. A joint between first and second intersecting strips (12, 14, 42, 50), the first strip (14, 50) being channel shaped and comprising a web (16, 48) and a flange (18, 46) along each edge of the web, the flanges diverging in the direction away from the web, and said second strip (12, 42) having a pair of slots (24, 26, 40) therein, said slots being at an angle to one another, the flanges of the first strip being in the slots of the second strip.

7. A joint as claimed in claim 6, wherein said web is planar.

8. A joint as claimed in claim 6, wherein said web includes a pair of flanks (20, 48) meeting at an apex thereby to provide a raised rib extending in the direction of the length of the first strip.

9. A joint as claimed in claim 6, 7 or 8, wherein said second strip



-14-

comprises a web (16) and a flange (18) along each edge of the web, said slots (24, 26) being formed in said flanges of said second strip.

10. A joint as claimed in claim 9, wherein said web of the second strip is planar.

5 11. A joint as claimed in claim 9, wherein said web of the second strip (42) includes a pair of flanks (48) meeting at an apex thereby to provide a raised rib extending in the direction of the length of the second strip.

10 12. A joint as claimed in claim 6, 7 or 8, wherein said second strip (42) comprises a web with a flange along each edge of the web, said web comprising two sloping flanks (48) meeting at an apex, said slots (40) being in said web.

15 13. A joint as claimed in any one of claims 6 to 12 and further comprising a cover strip (34) fitted to said first strip, the cover strip being in the form of a channel having a web (38) and a flange (36) along each edge of the web, the flanges of the cover strip diverging in the direction away from the web, outside faces of the flanges of the cover strip bearing on inside faces of the flanges of the first strip.

14. A joint as claimed in any one of claims 6 to 12 and further comprising a cover strip (28) fitted to said first strip, the cover strip being in the form of a channel having a web (30) and a flange (32) along each edge of the web, the flanges of the

-15-

cover strip converging in the direction away from the web, inside faces of the flanges of the cover strip bearing on outside faces of the flanges of the first strip.

15. Palisade fencing comprising a plurality of spaced fence posts (56) with their lower ends embedded in the ground, horizontal members (50, 48) extending  
5 between the fence posts, and a plurality of vertical members (42) between each adjacent pair of fence posts, the vertical members (42) and the horizontal members (50) each being channel shaped and comprising a web and a flange along each edge of the web, the flanges diverging in the direction away from the web, one of said members at each place where a vertical member intersects a horizontal  
10 member having slots therein, the slots being at an angle to one another, and the flanges of the member which intersects with the slotted member being in the slots of the slotted member.

16. Palisade fencing as claimed in claim 15, wherein the webs (44) of the vertical members comprise two sloping flanks (48) meeting at an apex, said slots  
15 (40) being formed in the webs (44) of the vertical members (42).

17. Palisade fencing as claimed in claims 15 or 16, wherein the vertical members and horizontal members are of identical profile.

18. Palisade fencing as claimed in any of claims 15 to 17, wherein each fence post (56) is hollow and has in the walling thereof openings (54) the shapes of

-16-

which match the profiles of said horizontal members (50), the ends of the horizontal members (50) entering the fence posts (56) through said openings (54) and the parts of the horizontal members within the posts being deformed to prevent their withdrawal from the posts through said openings.

5        19.            Palisade fencing as claimed in any one of claims 14 to 18, wherein the fence posts have holes (68) therein above the level of the top horizontal members (50), there being electrically insulating grommets (70) in the holes and wires (72) spanning between the fence posts (56) and passing through said grommets (70).

10       20.            Palisade fencing as claimed in any one of claims 15 to 18, wherein each fence post (76) comprises a lower part (78) and an upper part (80), the upper part (80) being mounted on the lower part by means of an electrically insulating connector (82) whereby the upper part is electrically isolated from the lower part, there being upper horizontal members (88) extending between the upper parts of the fence posts and each vertical member of the fencing comprising a lower part  
15       attached to a lower horizontal member and an upper part attached to an upper horizontal member, there being a gap between the lower part of each vertical member and the upper part of each vertical member whereby said parts are electrically isolated from one another.

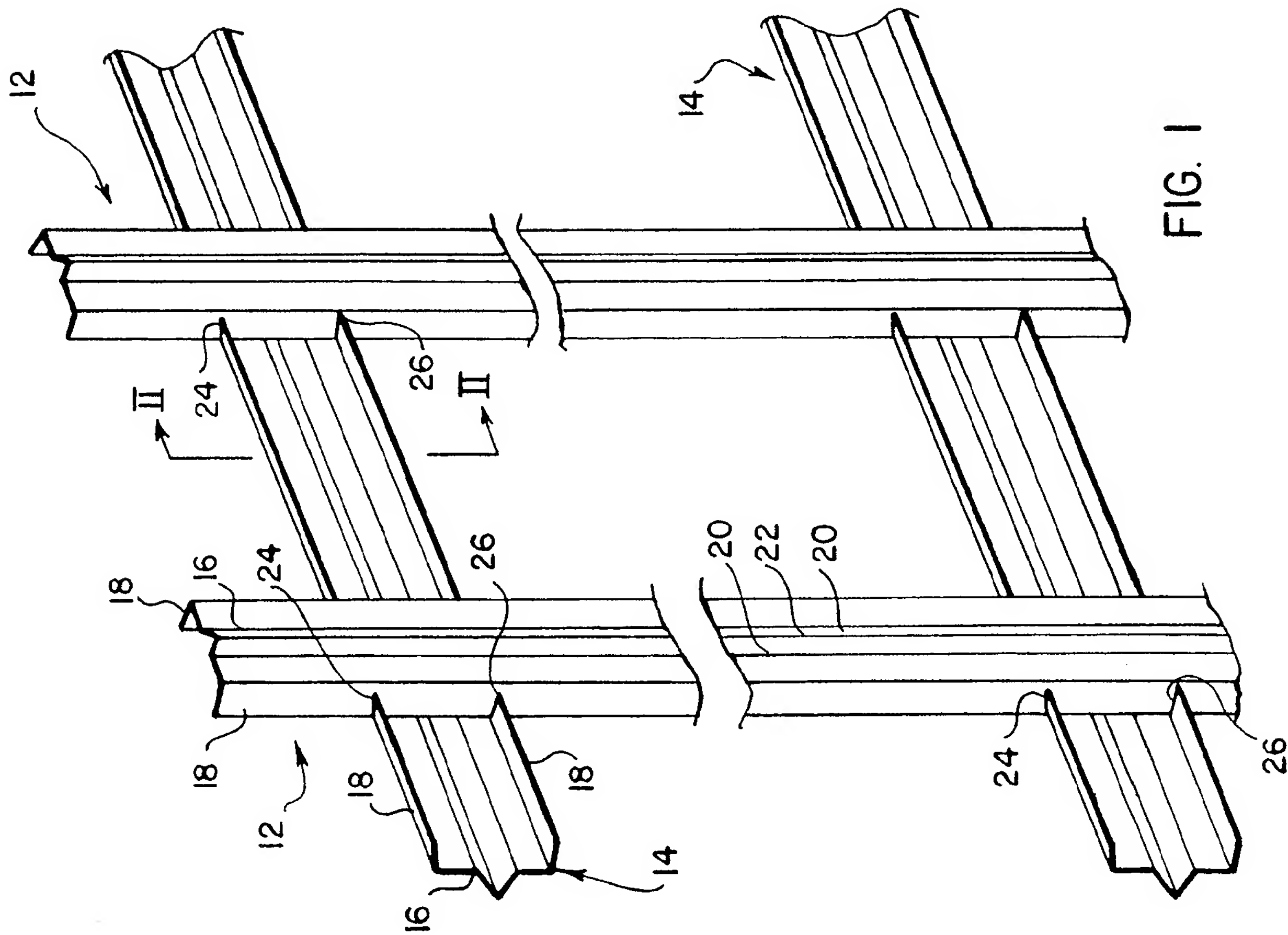


FIG. 1

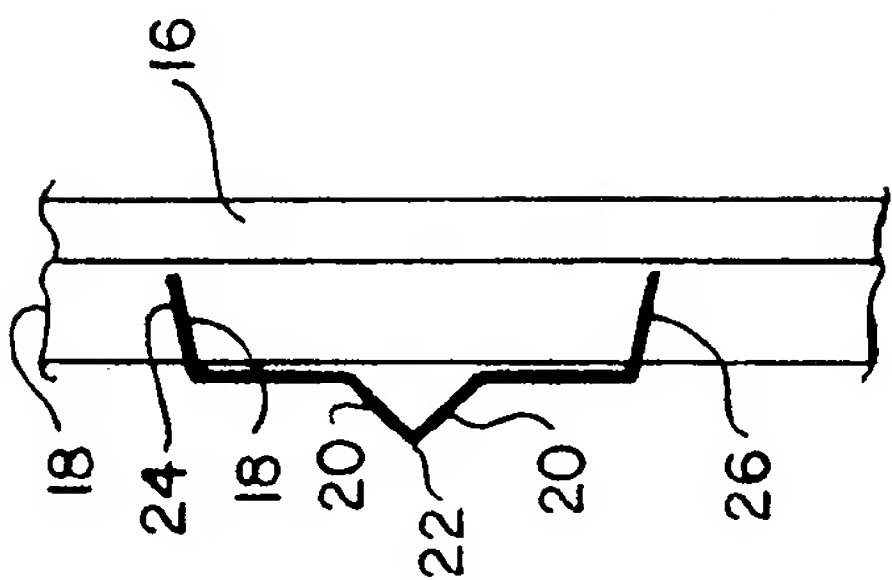


FIG. 2

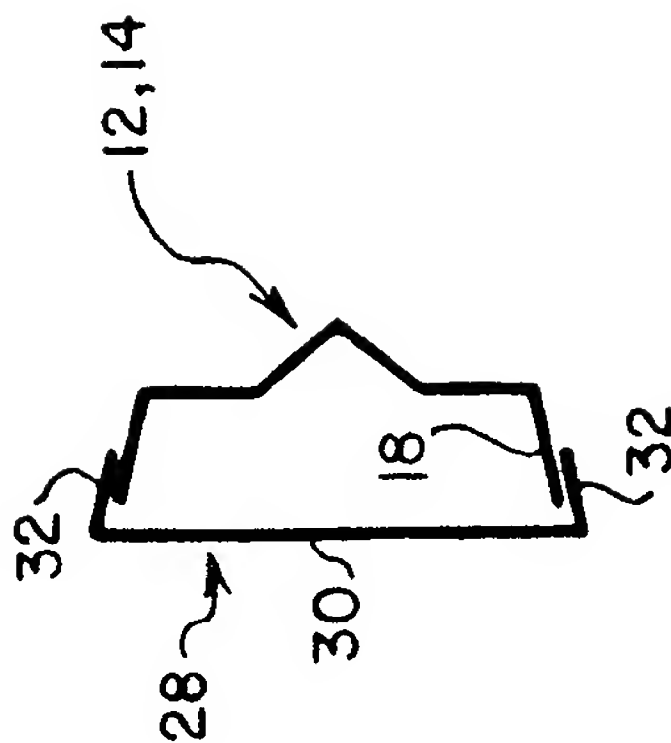


FIG. 2a

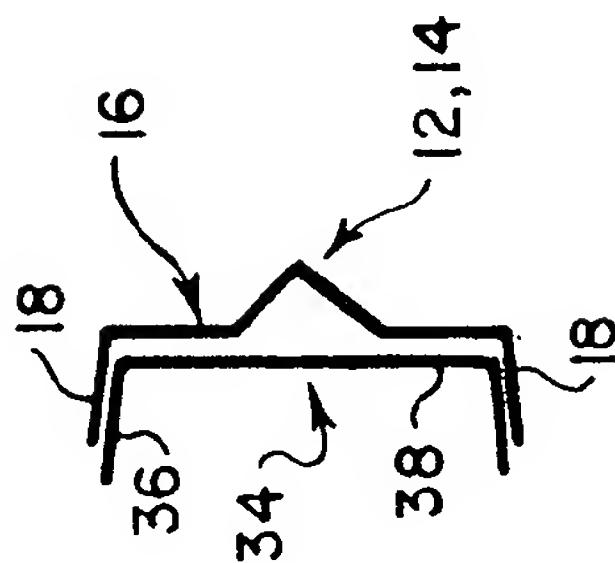


FIG. 2b

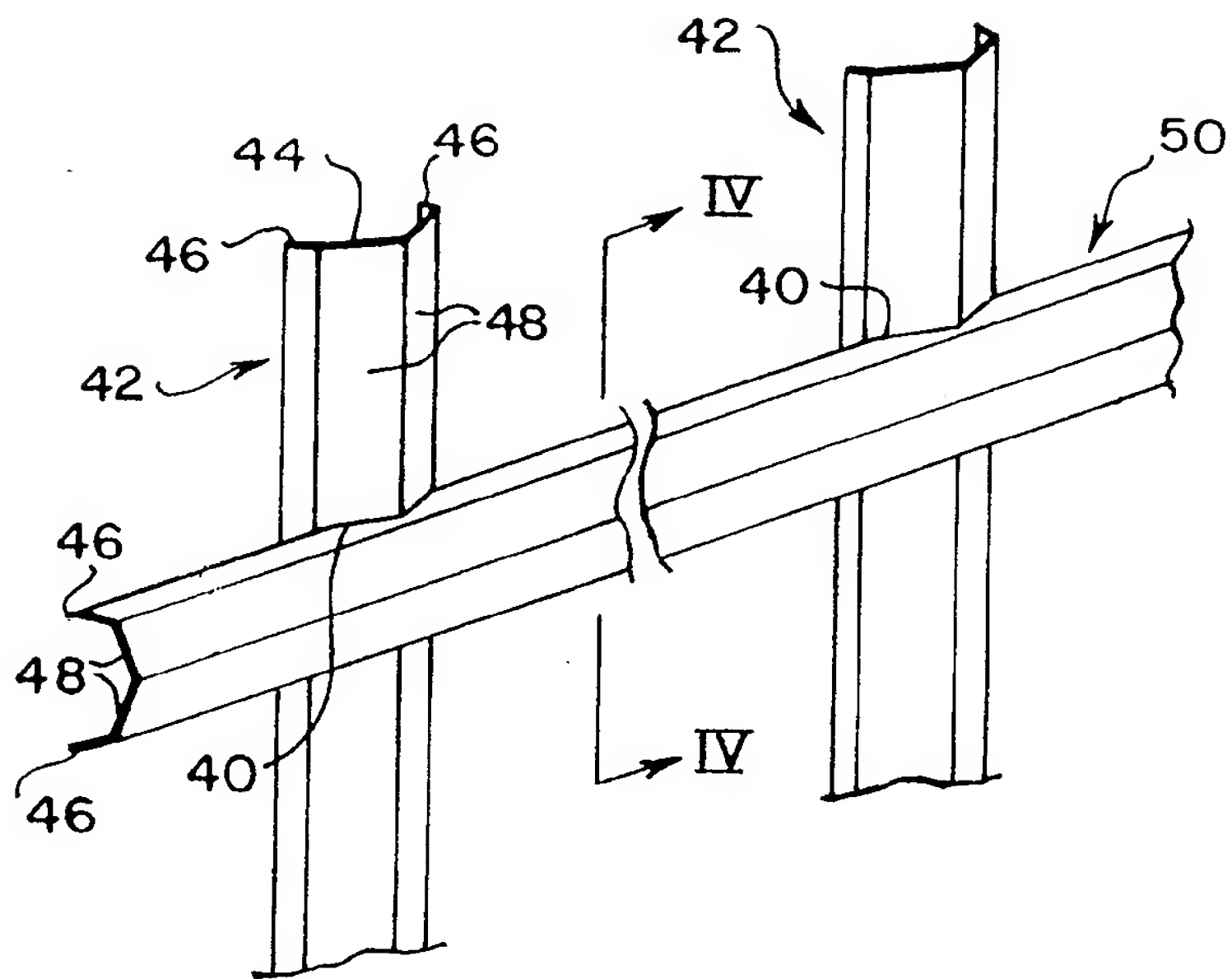


FIG. 3

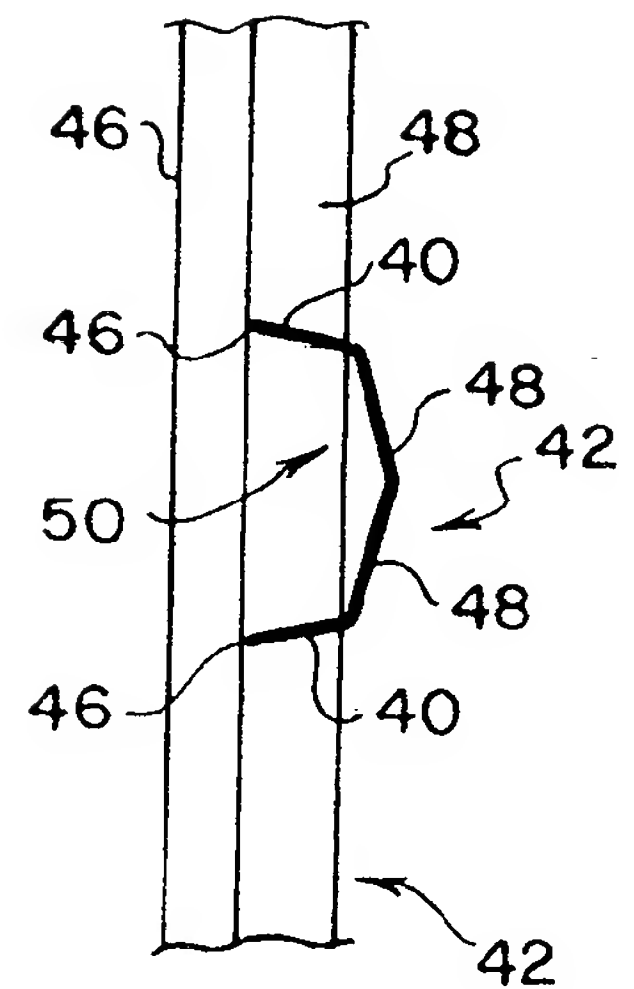


FIG. 4

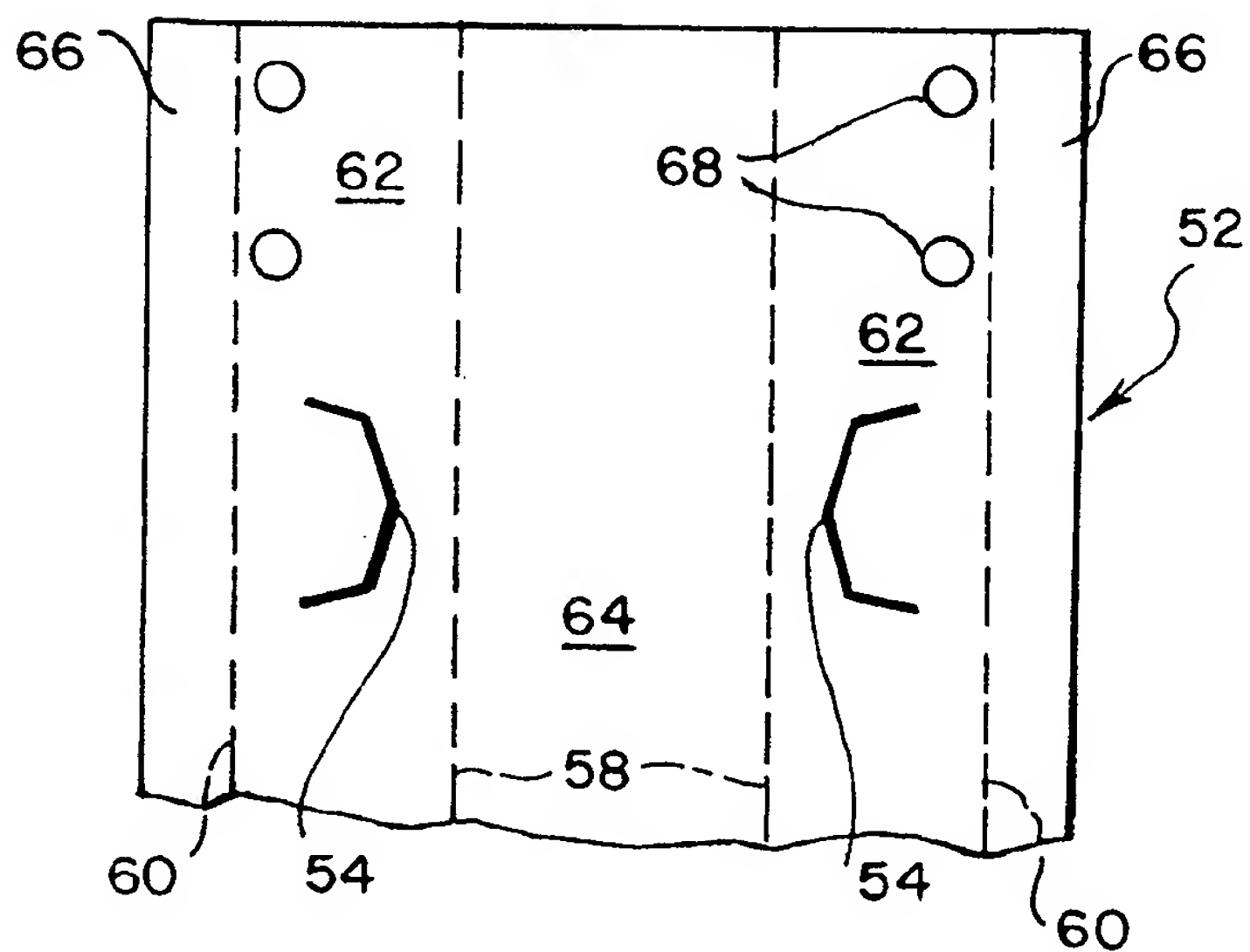


FIG. 5

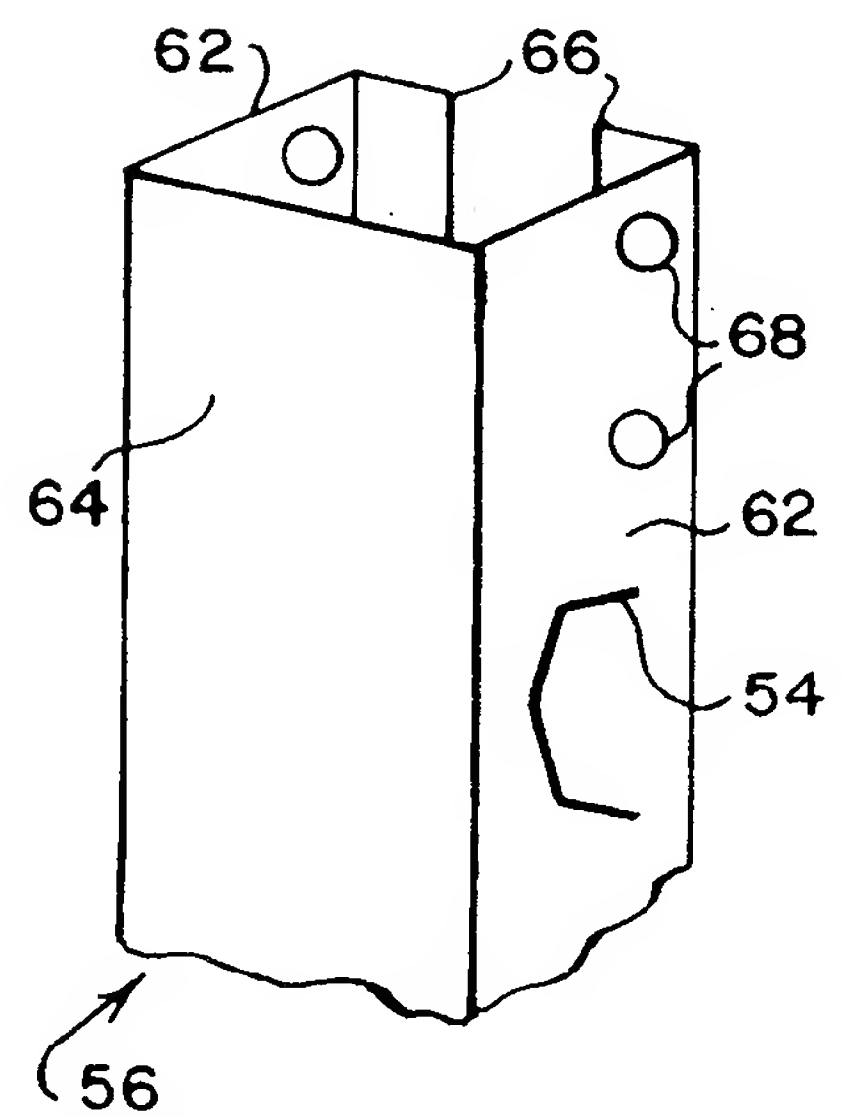


FIG. 6

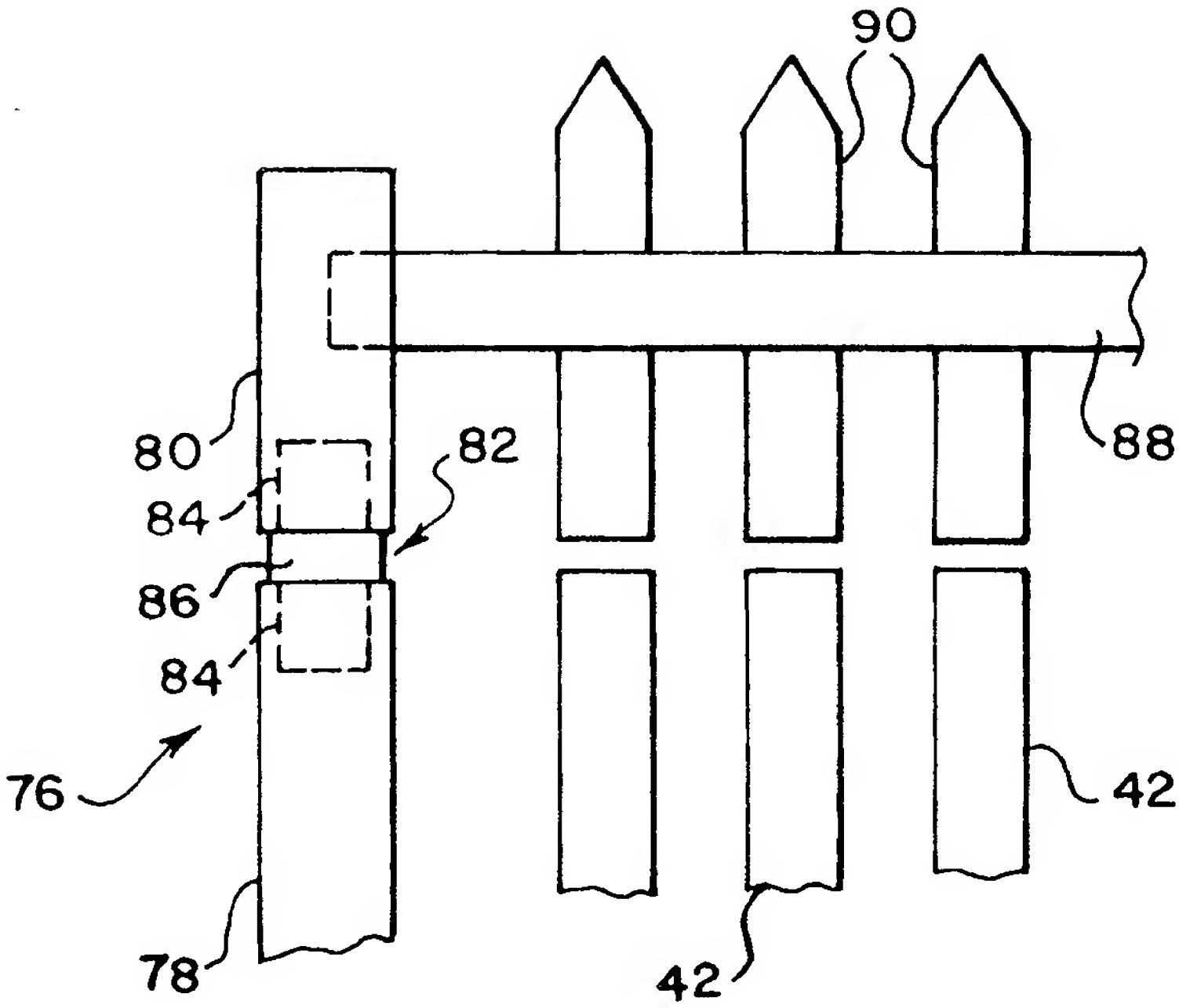


FIG. 8

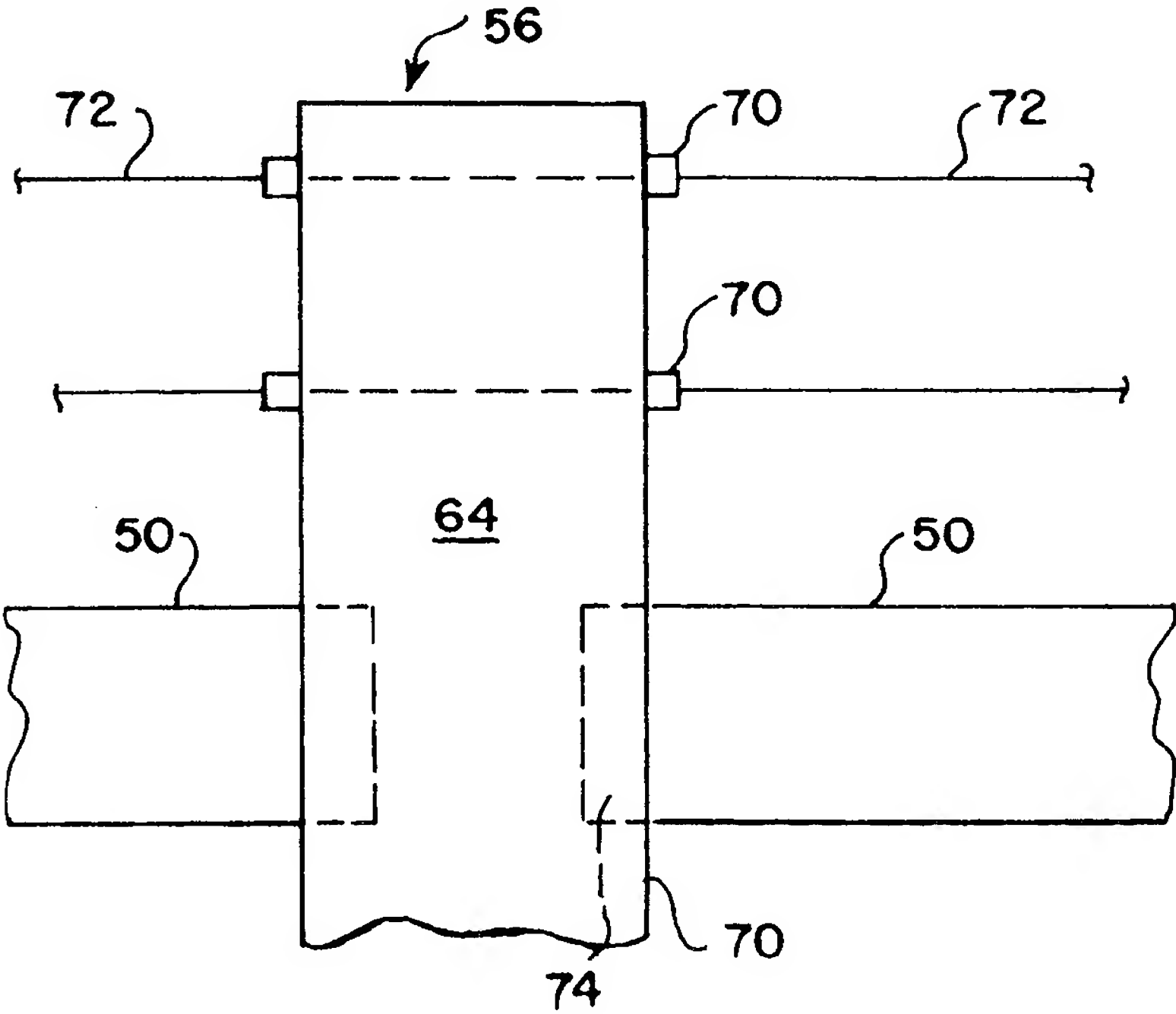


FIG. 7

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/AP 99/00001

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 E04H17/14 E04H17/24

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 E04H A01K E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 825 537 A (WOLFE & AL) 4 March 1958 see column 2, line 15 - line 69	1,6,7
Y	see column 3, line 17 - line 40; figures 1-7,10	2-4, 8-10,12, 16
X	DE 16 84 647 A (ECE PATENT AB) 4 December 1969	6,7,15, 17
Y	see page 3, line 15 - page 6, line 9	2-4,9, 10,18
A	see figures	14
Y	GB 1 584 760 A (FENSECURE LTD) 18 February 1981	8,12,16
A	see page 3, line 25 - line 53; figures	5
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

27 April 1999

Date of mailing of the international search report

10/05/1999

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# INTERNATIONAL SEARCH REPORT

Inte. .ional Application No

PCT/AP 99/00001

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2 919 113 A (COFIELD) 29 December 1959 see column 1, line 53 - column 2, line 7; figures 1,2 ---	18
A	EP 0 067 802 A (EKLUND KURT) 22 December 1982 see page 3, line 14 - line 22; figures 1,2 ---	5,12,16
A	US 3 942 763 A (HELTERBRAND ARLEN ET AL) 9 March 1976 see column 7, line 41 - column 8, line 8; figure 2 ---	8,11,16
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information on patent family members

International Application No

PCT/AP 99/00001

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